

REMARKS

- Claims 1, 7, 9, 10, 14, 17, 19, 23-25, 30, 44, and 49 have been amended.
- Claims 2, 3, and 31 have been cancelled without prejudice with respect to future filings.
- Claims 15, 26, 27, and 32-35 were previously withdrawn.
- Claims 1, 36, and 44 are in independent format.

1. Rejections Under 35 U.S.C. § 102(e)

A. Claims 1, 2, 7, 9, 10, 14, 30, 36-39, 44, 49, and 61

The Examiner's rejection of claims 1, 2, 7, 9, 10, 14, 30, 36-39, 44, 49, and 61 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,862,544 to *Merrill* is respectfully traversed. The MPEP at §2131 provides:

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required in the claim.

The '544 *Merrill* reference fails to anticipate each of the independent Claims 1, 36, and 44 because it fails to show a vehicle wheel balancer system as required by the amended claims. Rather, the '544 *Merrill* reference is directed towards a vehicle wheel alignment system for determining the camber and toe angles of a wheel mounted on a vehicle. Vehicle wheel alignment systems are designed to measure the relationship

between, and a spatial orientation of, the wheels of a vehicle, thereby enabling an operator to adjust various suspension and mounting components on the vehicle to achieve desired vehicle handling characteristics and tire wear. In contrast, a vehicle wheel balancer system is designed to measure the imbalance characteristics of an individual wheel assembly as it is rotated about its axis, and to facilitate the placement of imbalance correction weights on the surfaces of the wheel assembly when required to compensate for the measured imbalance characteristics. Wheel alignment systems and wheel balancer systems are mutually exclusive of each other, performing completely different functions in completely different manners.

i. Claim 1

Claim 1 as amended requires a wheel balancing system to include a central processing unit which is configured to utilize, during a wheel imbalance service procedure, a distance measurement associated with the imaged portion of a vehicle wheel rim which is identified from a two-dimensional optical image of the vehicle wheel rim received from an imaging sensor assembly. The '544 *Merrill* patent fails to show a vehicle wheel balancer system, and furthermore, fails to show such as system having a processor configured to utilize, during a wheel imbalance service procedure, measurements of a vehicle wheel rim acquired by an imaging sensor assembly. Accordingly, the '544 *Merrill* patent fails to anticipate each and every required limitation of Claim 1 under 35 U.S.C. § 102(3).

ii. Claim 36

Claim 36 of the present application sets forth an improved wheel parameter measurement apparatus for a dynamic wheel balancer which includes an optical energy

sensing means for generating a two dimensional image of an area of a vehicle wheel rim, and a processing means for receiving the images and extracting data related to a feature of the vehicle wheel rim. The '544 *Merrill* patent fails to disclose at least a wheel parameter measurement apparatus for a dynamic wheel balancer, and further fails to disclose a processing means for extracting data related to features of a wheel rim from received images. Rather, the '544 *Merrill* patent discloses a wheel alignment system configured to extract data from images which is related to a spatial orientation (toe or camber) of a wheel assembly. A spatial orientation of a wheel assembly is not a "feature" of the wheel assembly. The spatial orientation of a wheel assembly is a variable value, and is independent of the features of the wheel assembly. Accordingly, the '544 *Merrill* patent fails to anticipate each and every required limitation of Claim 36 under 35 U.S.C. § 102(3).

iii. Claim 44

Claim 44 of the present application sets forth a method for characterizing a feature of a vehicle wheel assembly consisting of at least a vehicle wheel rim, where the vehicle wheel assembly is mounted for rotational movement about an axis on a vehicle wheel balancer system. The method of Claim 44 requires the steps of (1) detecting reflected optical energy from a three-dimensional area of the vehicle wheel rim; (2) generating a two-dimensional image composed of a plurality of image pixels of the three-dimensional area of the vehicle wheel rim from the detected optical energy; (3) processing the generated image to extract data associated with at least one feature of the vehicle wheel rim; and (4) utilizing the extracted data during a wheel imbalance service procedure. The '544 *Merrill* patent fails to show a method for characterizing a

feature of a vehicle wheel assembly mounted on a vehicle wheel balancer system, and furthermore, fails to show at least the steps of extracting image data associated with a wheel rim feature and utilizing the extracted data during a wheel imbalance service procedure. The '544 *Merrill* patent teaches at best, the extraction of wheel assembly spatial orientations, not features, from images, for use during wheel alignment procedures. Accordingly, the '544 *Merrill* patent fails to anticipate each and every required step of Claim 44 under 35 U.S.C. § 102(e).

iv. Claim 7

With respect to Claim 7, the Examiner contends that the '544 *Merrill* patent discloses a vehicle service system wherein the CPU "is configured to utilize distance information to identify a surface profile of a vehicle wheel rim", citing Col. 2, lines 15-65. *However, when discussing the rejection under 35 U.S.C. § 103(a) of Claim 9 in the Office Action at Page 5, line 6, the Examiner makes the contradictory statement that "Merrill does not teach viewing a wheel edge profile."* It would appear to be improper for the Examiner to state that the reference discloses a feature when used for a 102(e) rejection, but that it fails to disclose the same feature when used for a 103(a) rejection.

Regardless, a review of the cited passages fails to reveal any disclosure related to the identification of a wheel rim surface profile, shape, or contour. Rather, the '544 *Merrill* patent teaches to identify a plurality of points about the wheel rim edge, and from those points, extrapolate a planar surface which is representative of the spatial orientation of the wheel in space. (See: Col. 3, lines 39-45). These points do not establish a profile of the wheel rim, which is generally thought of as the shape of the cross-section of the wheel rim. To the extent that the rim edge itself can be considered

a "profile" of the wheel, the '544 *Merrill* patent specifically states that it is assumed that the points on the wheel rim edge all lie in a common plane as a result of the manufacturing process of the wheel rim, hence, the '544 *Merrill* system does not actually identify a wheel rim profile. (See: Col. 4, lines 60-67). Accordingly, Claim 7 is not anticipated under 35 U.S.C. § 102(e) by the '544 *Merrill* patent for these reasons, and for the reasons set forth above in connection with parent Claim 1.

v. Claims 9 and 10

With respect to Claims 9 and 10, the Examiner contends that the '544 *Merrill* patent discloses that the processing system is configured to utilize distance information obtained from images of a wheel rim to calculate radial runout and lateral runout of the wheel rim, citing to Col. 4, lines 58-67. However, the Examiner's statements are in direct contradiction to the disclosure at Col. 4, lines 58-67, which specifically state that the "runout" of the wheel rim is not known, since the wheel is not rotated about its axis during the acquisition of images by the system of the '544 *Merrill* patent. The '544 *Merrill* patent does not disclose a system which measures either lateral or radial runout of a vehicle wheel rim, and hence Claims 9 and 10 are not anticipated under 35 U.S.C. § 102(e) by the '544 *Merrill* patent.

vi. Claim 14

With respect to Claim 14, the Examiner contends that the '544 *Merrill* patent shows a vehicle wheel service system which is configured to utilize distance information to identify a miss-centering of a vehicle wheel rim on a rotating support structure, citing to Col. 3, line 60 – Col. 4, line 2. The cited passages are in fact, directed towards the mounting of an image sensor assembly on a circular track for movement about a circle

during the acquisition of images of a wheel rim. There is no disclosure of the identification of a miss-centered mounting of a vehicle wheel rim on a rotating support structure, such as the rotating shaft of a vehicle wheel balancer system. Furthermore, the '544 *Merrill* patent specifically describes a system which is insensitive to miss-centering of a wheel rim relative to the axis of rotation of the camera, so long as a sufficient portion of the wheel rim is within the camera field of view. (See: Col. 5, lines 13-30). Accordingly, Claim 14 is not anticipated under 35 U.S.C. § 102(e) by the '544 *Merrill* patent for these reasons, and for the reasons set forth above in connection with parent Claim 1.

vii. Claim 30

With regards to Claim 30, the Examiner contends that the '544 *Merrill* patent shows a vehicle service system having a CPU configured to utilize distance information *to alter a configuration of one or more components of the vehicle service system*. The Examiner cites generally Col. 2, lines 15-65. The '544 *Merrill* patent fails to disclose any alteration of components of a vehicle balancing system *in response to measured distance information acquired by an imaging sensor*, either at the passages cited by the Examiner or elsewhere. Accordingly, Claim 30 is not seen as properly anticipated under 35 U.S.C. § 102(e) by the '544 *Merrill* patent.

viii. Claims 37-39

Claims 37-39 each depend from independent Claim 36, and accordingly, includes each and every limitation of Claim 36. As set forth above, the '544 *Merrill* patent fails to teach or suggest each and every limitation of Claim 36. Accordingly, the '544 *Merrill* patent fails to teach or suggest each and every limitation of dependent

Claims 37-39, and Claims 37-39 are seen as novel under 35 U.S.C. § 102(e) in view of the '544 *Merrill* patent for at least the same reasons as parent Claim 36.

ix. Claims 49 and 61

With regards to Claims 49 and 61, the Examiner contends that the '544 *Merrill* patent shows a vehicle wheel balancing system configured for the acquisition of stereoscopic images of a wheel rim, citing Figure 3 and Cols. 2-4. A review of Figure 3 reveals that the figure in question illustrates the use of a single camera and a laser projection system. A single camera configured to acquire images of a projected laser line cannot acquire stereoscopic images. Acquisition of stereoscopic images requires multiple cameras which are configured to acquire images of a common target object from two different points of view. Furthermore, the '544 *Merrill* reference is directed towards a vehicle wheel *alignment* system, which is designed to determine the spatial orientation of a vehicle wheel when mounted on a vehicle, and not a vehicle wheel balancing system designed to measure imbalances in an individual wheel assembly. Accordingly, the '544 *Merrill* patent fails to teach or suggest each and every limitation of dependent Claims 49 and 61, and these claims are seen as novel under 35 U.S.C. § 102(e) in view of the '544 *Merrill* patent.

2. Rejections Under 35 U.S.C. § 103(a)

A. Claims 9 and 23

The rejection of Claims 9 and 23 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,862,544 to *Merrill* in view of U.S. Patent Application Publication No. 2002-0018218 A1 to *Conheady* is respectfully traversed. The Examiner's stated position with respect to Claim 9 does not correspond with the

limitations set forth in Claim 9, but rather, with the limitation set forth in Claim 19. Accordingly, Applicant is assuming that the Examiner intended to apply this rejection to Claim 19, and not to Claim 9 which has been previously discussed as being rejected under 35 U.S.C. § 102(e) by the '544 *Merrill* reference. If this assumption is in error, the Examiner is respectfully requested to notify the Applicant's representative.

i. Claim 9 (19)

The Examiner's stated basis for the rejection of Claim 19 is that it would have been obvious to modify the '544 *Merrill* reference to include the edge profile viewing portion as disclosed by the *Conheady* reference, "*as this is a common feature that is viewed with this type of wheel alignment system and adds no new or unexpected results.*" Initially, it is noted that the '544 *Merrill* reference is a wheel alignment system, and that the *Conheady* reference is a wheel balancer system. These two types of systems do not perform the same function in the automotive service industry, and are generally not of a nature which can be combined. An alignment system measures the position and orientation of wheel assemblies mounted on a vehicle, while a balancer system measures the balance characteristics of a individual wheel assembly dismounted from a vehicle. Accordingly, one of ordinary skill in the art of wheel balancing would not look to the teachings of a wheel alignment system for improvements therein, and vice versa.

The '544 *Merrill* reference is a vehicle wheel alignment system which is configured to determine wheel camber and toe angles by estimating the orientation of a plane representative of the wheel rim from acquired images thereof. The *Conheady* reference describes a complicated mechanical system for scanning a laser point across

a surface of a vehicle wheel rim, and acquiring images of the scanned point to generate a wheel rim profile. However, wheel rim edge profile data is not utilized by the '544 *Merrill* reference to determine wheel alignment data. Hence, there is no teaching or suggestion to combine the '544 *Merrill* reference with the *Conheady* reference, and a rejection of Claim 19 under 35 U.S.C. § 103(a) is improper. Accordingly, Claim 19 is believed to be allowable under 35 U.S.C. § 103(a) over *Merrill* in view of *Conheady*.

ii. Claim 23

The Examiner's stated basis for the rejection of Claim 23 is that the '544 *Merrill* reference shows all the limitations of the claim, but for the requirement that a feature include an installed imbalance correction weight. The Examiner contends that the *Conheady* reference discloses installed imbalance correction weights, and that it would have been obvious to modify the '544 *Merrill* reference to include installing an imbalance correction weight as this would add no new or unexpected results.

The Examiner's rejection does not correspond with the limitations of Claim 23. Claim 23 requires that the processing unit be configured to utilize determined measurements to identify an imbalance correction weight which is already installed on the wheel rim. In other words, the processor evaluates the acquired images to detect the presence and location of a weight already installed on the wheel rim. As discussed previously, the '544 *Merrill* reference is a vehicle wheel alignment system, and is not designed to measure or correct imbalance in a vehicle wheel. Accordingly, it would not be "obvious" to modify the '544 *Merrill* reference to include installing an imbalance correction weight as taught by *Conheady*. Furthermore, neither reference, nor the combination of the references, teaches or suggests a processing unit configured to

utilized data acquired from images of a wheel rim to identify the presence of an installed imbalance correction weight on a wheel rim surface. Therefore, Claim 23 is seen as allowable under 35 U.S.C. § 103(a) over the cited references.

B. Claim 17

The rejection of Claim 17 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,862,544 to *Merrill* in view of U.S. Patent No. 4,723,445 to *Ripley* is respectfully traversed. Applicant notes that the Examiner's stated basis for the rejection includes reference to the *Conheady* published application. It is unclear if the *Conheady* reference is being considered as part of the basis for rejecting Claim 17.

The '445 *Ripley* reference is directed towards a vehicle wheel and tire pressure monitor. The passages cited by the Examiner at Col. 2, lines 27-47 describe the physical characteristics of a vehicle wheel, and indicate that wheels have spokes. This is a statement of general background fact, and does not teach or suggest any need to determine the configuration or profile of wheel spokes. Furthermore, the subject matter of the '445 *Ripley* reference is extremely distant from the field of vehicle wheel balancing. One of ordinary skill in a vehicle wheel balancing field would not have any motivation to look to the teachings of a tire pressure monitoring apparatus for use in connection with an optical imaging vehicle wheel alignment system such as the '544 *Merrill* reference. Furthermore, the Examiner's statement that it "would have been obvious to modify *Conheady* to include features to be spoke configuration or spoke profiles *because these features are necessary when determining the balance of a wheel*" is in error. It is not necessary to have any knowledge of wheel spoke configuration, profile, or placement when determining the imbalance of a vehicle wheel.

In summary, the '544 *Merrill* reference teaches the use of optical images of wheel rim points to establish the orientation (camber and toe) of a wheel rim mounted on a vehicle. The '445 *Ripley* reference teaches a tire pressure monitor for use with a vehicle wheel having spokes, and the *Conheady* reference teaches to track a laser dot across a surface of a wheel rim to ascertain a rim profile. The combination of these references in the manner described by the Examiner completely fails to teach or suggest the limitations of Claim 17, as none of these references alone or in combination, suggests to one of ordinary skill in the art a system which identifies either a wheel spoke configuration or a wheel spoke profile using data acquired from two-dimensional images of a wheel rim surface. Accordingly Claim 17 is seen as allowable under 35 U.S.C. § 103(a) in view of the cited references.

C. Claim 24

The rejection of Claim 24 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,862,544 to *Merrill* in view of U.S. Patent No. 4,584,469 to *Lovalenti* is respectfully traversed. The Examiner's stated basis for the rejection is that the '544 *Merrill* reference discloses all of the limitations of the claim, but fails to disclose that the identified features is a wheel rim surface defect. The Examiner contends that the '469 *Lovalenti* reference discloses detecting wheel rim surface defects, and that as such, it would have been obvious to combine this with the '544 *Merrill* reference because this feature is "necessary when determining the balance of a wheel".

It should be noted that the detection of wheel rim surface defects is not necessary for determining the balance of a wheel. Furthermore, the '469 *Lovalenti* reference is directed towards a system for determining subsurface defects in

translucent materials by observing the optical characteristics of light passing through the translucent material. Vehicle wheel rims are opaque, and are not translucent. Any techniques for detecting subsurface defects in a material as taught by the '469 *Lovalenti* reference cannot be utilized for the detection of surface defects on a vehicle wheel rim due to the different optical characteristics of the materials involved. Accordingly, one of ordinary skill in the art of vehicle wheel balancing systems would not have any motivation to modify the teachings of a vehicle wheel alignment system ('544 *Merrill*) with the teachings of a glass defect detection system ('469 *Lovalenti*) to produce a vehicle wheel balancer system which utilized data acquired from images of a wheel rim surface to detect defects on the surface thereof. Any such combination would likely be inoperable. Accordingly, Claim 24 is seen as allowable under 35 U.S.C. § 103(a) in view of the cited references.

D. Claim 25

The rejection of Claim 25 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,862,544 to *Merrill* in view of U.S. Published Application No. 2002/0000121 to *Carter* is respectfully traversed. The Examiner's stated basis for the rejection is that the '544 *Merrill* reference shows a vehicle service system including an imaging sensor and a processing unit configured to received distance information from the imaging sensor to facilitate vehicle wheel rim procedures, but does not specifically show where to place imbalance correction weights. The Examiner cites the '121 *Carter* publication as showing where to place imbalance correction weights on a vehicle wheel rim (Paragraph 4), and concludes it would have been obvious to combine the two references to produce the claimed invention.

As previously discussed, the '544 *Merrill* reference is a vehicle wheel alignment system, and not a vehicle wheel balancing system. As such, the '544 *Merrill* reference does not disclose the determination of imbalance correction weights for placement on a vehicle wheel rim. The '121 *Carter* reference discloses a basic wheel balancer system, which is capable of calculating required imbalance correction weights for installation on a vehicle wheel rim to compensate for measured imbalance. The '121 *Carter* reference, and most other vehicle wheel balancers, provides the operator with an indication as to where to place the required imbalance correction weights to compensate for the measured imbalances in the vehicle wheel rim.

However, the '121 *Carter* reference, either alone or in combination with the teachings of the '544 *Merrill* reference completely fails to teach or suggest to one of ordinary skill in the art the limitations of Claim 25 as amended. Specifically, the cited combination of references fails to teach or suggest a vehicle wheel balancer system which is configured to utilize distance measurements acquired from images of a wheel rim surface to select a placement location for an imbalance correction weight on the the wheel rim surface. Selection of a placement location (see: Para. 0068 and 0069) using image data is different from merely providing the operator with an identification of a placement location which has been selected using conventional balancing procedures (such as described in the '121 *Carter* publication). Accordingly, Claim 25 is seen as allowable under 35 U.S.C. § 103(a) in view of the cited references.

3. Conclusion

If for any reason the Examiner is unable to allow the application on the next Office Action and feels that an interview would be helpful to resolve any issues, the

Examiner is respectfully requested to contact the undersigned attorney for the purpose of arranging such an interview.

Respectfully submitted,

A handwritten signature in cursive script that reads "Mark E. Books". The signature is written in black ink and is positioned above a horizontal line.

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